Antiulcer activity of Muntingia calabura leaves involves the modulation of endogenous nitric oxide and nonprotein sulfhydryl compounds

ABSTRACT

Context: Muntingia calabura L. (Muntingiaceae) is a native plant species of the American continent and is widely cultivated in warm areas in Asia, including Malaysia. The plant is traditionally used to relieve pain from gastric ulcers. Objective: This study was designed to determine the antiulcer activity of a methanol extract of M. calabura leaves (MEMC) and the possible mechanisms of action involved. Materials and methods: An acute toxicity study was conducted using a single oral dose of 2000 mg/kg MEMC. The antiulcer activity of MEMC was evaluated in absolute ethanol- and indomethacin-induced gastric ulcer rat models. MEMC was administered orally (dose range 25–500 mg/kg) to rats fasted for 24 h. The animals were pretreated with NG-nitro-l-arginine methyl esters (l-NAME) or N-ethylmaleimide (NEM) prior to MEMC treatment to assess the possible involvement of endogenous nitric oxide (NO) and nonprotein sulfhydryl (NP-SH) compounds in the gastroprotective effect of MEMC. Results: As the administered dose did not cause toxicity in the rats, the oral median lethal dose (LD50) of MEMC was >2000 mg/kg in rats. MEMC exerted significant ($p < 0.001$) gastroprotective activity in the ethanol- and indomethacin-induced ulcer models dose-dependently. Histological evaluation supported the observed antiulcer activity of MEMC. l-NAME and NEM pretreatment significantly ($p < 0.05$) reversed and abolished the gastroprotective effect of MEMC, respectively. Discussion and conclusion: The results obtained indicate that MEMC has significant antiulcer activity that might involve the participation of endogenous NO and NP-SH compounds. These findings provide new pharmacological information regarding the potential use of M. calabura.

Keyword: Gastroprotection; Leaves; Methanol extract; Muntingia calabura; Nitric oxide; Peptic ulcers; Sulfhydryl group